

## 3.3 Diffusion in gases

T

When two gases are placed in contact they gradually become mixed. This mixing is called diffusion. It shows that gases are made of small particles which can move about easily. These small particles are called molecules.

### Aim

To demonstrate diffusion using bromine, carbon dioxide and hydrogen.

### Apparatus and materials

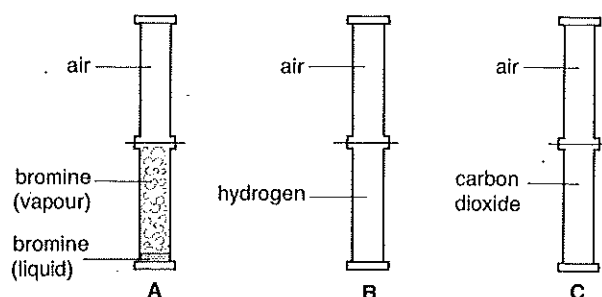
Six gas jars with lids	Bromine
Vaseline	Carbon dioxide
A sheet of white paper	Hydrogen
Limewater	Splints

### Precautions

Bromine is a highly corrosive liquid. Rubber gloves and eye protection must be used when it is handled. A fume cupboard should be used as the vapour is poisonous.

### Procedure

- 1 Fill three separate gas jars with hydrogen, bromine and carbon dioxide. Place a lid on top of each gas jar.
- 2 Fill three more gas jars with air and place a lid on top of each one.



- 3 Arrange the six gas jars as shown in the diagram above and leave them for five minutes. Leave the gas jars in A for a further 30 minutes.
- 4 Separate the two gas jars in B. Apply a lighted splint to the bottom gas jar.
- 5 Separate the two gas jars in C. Add limewater to the top gas jar. Place a lid on top of this gas jar and shake the gas jar and contents.
- 6 Place a sheet of white paper behind the top gas jar in A and observe the colour.

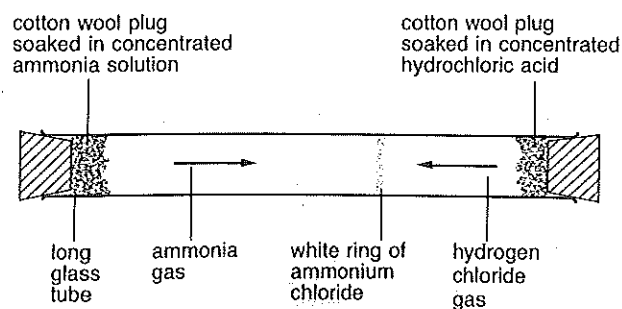
### Results

Copy and complete the following table:

experiment	observation of the gas jar containing air
A	
B	
C	

### Questions

- 1 a) Describe the appearance of the top gas jar in experiment A after 5 minutes and after 30 minutes.  
b) What happens to the gas in the bottom gas jar in experiment B when a lighted splint is applied?  
c) Describe the appearance of the limewater after it is shaken with the contents of the top gas jar in experiment C?  
d) How is the bromine vapour made more visible?  
e) How are the gas jars filled with air?
- 2 The equipment in the diagram below was used to show diffusion.



- Which gas molecules have the greater speed – ammonia molecules or hydrogen chloride molecules?
- Why was the tube placed horizontally and not vertically?
- What is the reason for corking the ends of the tube?
- Why are the rates of diffusion so slow when it is known that the molecules travel at hundreds of metres per second in a vacuum?
- What would be the deposit if hydrobromic acid had been used instead of hydrochloric acid?